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Effective Modulation Transfer Function of Light Transmission through Rough Ocean Surfaces

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LONG-TERM GOALS

My work involves experimentally investigating the interrelationships and variability of optical properties in the ocean and atmosphere. My goal is to define the variability of the optical properties, particularly those dealing with light scattering, and to improve the prediction capabilities of image and radiative transfer models used in the ocean. My near term ocean optics objectives have been: 1) to improve the measurement capability of measuring the in-water and above-water spectral radiance distribution and extending this capability to polarization, 2) to investigate the variability of the Point Spread Function (PSF) as it relates to the imaging properties of the ocean, and 3) to improve the characterization of the Bi-directional Reflectance Distribution Function (BRDF) of benthic surfaces in the ocean, and 4) to understand the capabilities and limitations of using radiative transfer to model the BRDF of particulate surfaces.

OBJECTIVES

The original PI on this grant, Tony Elfouhaily, passed away. I have now taken over this grant, but the objectives have changed as the work is now combined with my work looking at the downwelling spectral polarized radiance distribution, in the near surface of the ocean. The objective of this work is to investigate the polarization of the downwelling light field near the surface.

APPROACH

Please see associated report “Use of the polarized radiance distribution camera system in the RADO program”. This report explains our progress to date.

WORK COMPLETED

Please see associated report “Use of the polarized radiance distribution camera system in the RADO program”. This report explains our completed work.

RESULTS

Please see associated report “Use of the polarized radiance distribution camera system in the RADO program”. This report explains our results.

IMPACT/APPLICATIONS

See “Use of the polarized radiance distrubiont camera system in the RADO program”

RELATED PROJECTS

This project is part of the overall ONR RadYO program. We also have DURIP support to build the instrument, fundamental to this work. Our work on the polarized radiance distribution is also related to our efforts with NASA funding to look at both the upwelling radiance distribution and the polarized upwelling radiance distribution. This project is actually directly part of my other work: “Use of the polarized radiance distrubiont camera system in the RADO program”